

CLAIM

1. A detector assembly for use in a computed tomography scanner,
the detector assembly comprising:
 - a detector array;
 - 5 a thermoelectric cooler coupled to the detector array;
 - a temperature sensor coupled to the detector array;
 - a heater, coupled to a center portion of the detector array,
 - a controller device, the controller device being electrically
coupled to the temperature sensor to receive an actual temperature
10 signal and to the thermoelectric cooler to provide an adjustable power
to the thermoelectric cooler, the controller device comparing the actual
temperature signal to a set point value and adjusting the power supply
to the thermoelectric cooler and driving the heater to maintain the actual
temperature substantially at the set point.
- 15 2. The detector assembly as defined in claim 1, further comprising:
 - a temperature sensor coupled to a center portion of the detector
array; and
 - a heater, coupled to the center portion of the detector array,
 - 20 wherein the controller device receives an actual temperature signal
from the temperature sensor and drives the heater to maintain the
actual temperature in the center portion at a selected set point.

3. The detector assembly as defined in claim 1, wherein the controller drives the thermal electric cooler and the heater to provide a selected temperature profile along the array.
- 5 4. The detector assembly as defined in claim 3, wherein the controller drives the heater and the thermoelectric cooler to provide a temperature profile that is substantially parabolic along the length of the array.
- 10 5. The detector assembly as defined in claim 1, further comprising a heat sink coupled to the thermoelectric cooler.
6. The detector assembly as defined in claim 1, further comprising a fan directed at the thermoelectric cooler.
- 15 7. The detector assembly as defined in claim 5, further comprising:
a first and second rail, the first and second rails being coupled to opposing sides of the detector array; and
a conductive insert coupled to at least one of the first and second
20 rails, the conductive insert transferring heat along the rail.

8. The detector assembly as defined in claim 7, wherein the conductive insert comprises at least one of a copper, a pyrolytic graphite, or a carbon based composite material.

5 9. The detector assembly as defined in claim 1, further comprising an insulating cover, the insulating cover being coupled to each of the bottom, sides, and ends of the detector assembly.

10 10. A method for maintaining a temperature profile along an array detector array in a substantially isothermal and thermally stable condition during CT scanning operations, the method comprising:

coupling a thermoelectric cooler to each end of the x-ray detector array;

selecting an operating temperature for operating the detector array;

15 15 sensing an actual temperature of the detector array at each of a center portion and a first end or second end of the detector array;

providing a heater to control the temperature of the center position of the array; and

20 20 comparing the selected operating temperature and the actual sensed temperature, and commanding the thermoelectric cooler to heat or cool the x-ray detector array and the heater to heat the center portion of the array based on the difference between the selected

operating and sensed temperatures, wherein a temperature profile along a length of the detector is maintained.

11. The method as defined in claim 10, further comprising the step of
5 coupling a heat conductive material along the length of the detector array, the heat conductive material transferring heat along the length of the x-ray detector device.

12. The method as defined in claim 10, further comprising the step of
10 passively dissipating heat produced by the thermoelectric cooler.

13. The method as defined in claim 10, further comprising the step of actively dissipating heat produced by the thermoelectric cooler

14. The method as defined in claim 10, further comprising the step of
15 insulating the detector array to prevent heat produced by an X-ray tube or cold air in a gantry from affecting the detector assembly.

15. The method as defined in claim 11, further comprising the step
20 of:

sensing a temperature at each of a center portion and a first end or second end of the detector array, providing a thermoelectric cooler to control a temperature at each end of the array; and

providing a heater to control the temperature of the center position of the array, wherein a temperature profile along a length of the detector is maintained.

5 16. A detector assembly for use in a computed tomography scanner, the detector assembly comprising:

 a detector array;

 first and second rails, the first and second rails disposed on opposing sides of the detector array, each of the first and second rails
10 including a conductive insert for conducting heat along the length of the detector array;

 a thermoelectric cooler coupled to a distal end of each of the first and second rails, the thermoelectric cooler including a positive and a negative power lead for receiving a power supply;

15 a passive heat dissipating device coupled to the thermoelectric cooler;

 a plurality of temperature sensors coupled at spaced intervals along the detector array;

 a heater directed at a center portion of the detector array; and

20 a controller device, the controller device being electrically coupled to the thermoelectric cooler, the heater, and to the plurality of temperature sensors, wherein the controller device receives a plurality of signals indicative of a temperature of the detector array from each of

the temperature sensors, compares the received signals to a corresponding plurality of selected set point temperatures, and supplies a drive signal to each of the thermoelectric coolers and the heater to maintain the array at the selected temperature.

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17. The detector assembly as defined in claim 16, further comprising an active heat dissipating device, the active heat dissipating device providing an air flow to the thermoelectric cooler to dissipate heat produced by the controller.

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18. The detector assembly as defined in claim 16, wherein the thermoelectric cooler is coupled to the detector array to provide a heating element to the array.

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19. The detector assembly as defined in claim 16, wherein the thermoelectric cooler selectively provides a heating element or a cooling element to the array.

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20. The detector assembly as defined in claim 16, wherein the controller maintaining a actively contoured temperature profile such that the array is hotter in a center portion than at opposing ends of the array.